APR 2026/RE/SN-1

TECHFLASH

Fraunhofer

Hydrogen Production from Sustainable Synthesis Products [Thermochemical H_2 Production]

Sustainably produced hydrogen derivatives will play a major role as future energy carriers, as they can be transported and stored in existing infrastructure. New and efficient conversion via catalytic reforming processes will be decisive in spreading their utilization in all sectors.

The Fraunhofer ISE aim to contribute to climate protection by substituting fossil fuels in all sectors of the future energy economy. Hydrogen-based molecules such as ammonia, methanol and dimethyl ether are most promising for this substitution, because the infrastructure for their large-scale transportation via ship already exists and connects energy suppliers and consumers on the global trading market. Furthermore, such molecules can be utilized across all sectors for power and heat generation, the chemical industry, and transportation.

The CatVap® technology used for emission reduction for the exhaust after treatment of combustion engines is an example of partial reforming of liquid energy carriers. This process principle is being further developed for liquefied gases such as dimethyl ether and ammonia, to enable their application in engines, fuel cells, burners, and furnaces. For many upcoming applications, hydrogen itself is even more valuable than the energy carriers itself. Large-scale catalytic reforming processes installed in harbors or industrial areas, or on a smaller scale catalytic reforming processes enable the thermochemical conversion of sustainable synthesis products to hydrogen.

Electrically heated catalyst carrier in development to support thermochemical hydrogen production

Reforming Reactions Supported by Electrically Heated Catalyst Carriers: Electrically heated catalyst carriers facilitate compact reactor designs. The precise heating makes them more efficient than conventional thermal reformers and environmentally friendlier by using renewable electricity to supply endothermal reactions. Dynamic and flexible control enables a rapid response to changing process and market demands, such as electricity prices, and expands energy sovereignty.

Our Offer:

- Development and design of innovative reactors and reforming processes for thermochemical hydrogen production from energy sources such as ammonia, methanol, dimethyl ether, biogas, or liquid organic hydrogen carriers (LOHC)
  - Implementation of electrical heating concepts in so-called e-crackers
- In-situ and ex-situ characterization of reforming catalysts to evaluate activity, selectivity, and stability under controlled process conditions
- Evaluation/analysis of various applications for hydrogen-based synthesis products, by means of
  - Construction and 24/7 operation of pilot-scale test environments
  - Precise process simulations of energy consumption, as well as cost calculations
  - Reactor optimization, using Computational Fluid Dynamics (CFD) simulations
- In-house software development for the acquisition of sensor data in real time and its visualization, as well as customized control algorithms

> Click Here < to receive more info on this TechFlash.

Kindly get in touch with us if you are interested in this technology or require further information.
Thanks and Regards,

Ms. Anandi Iyer
Director, Fraunhofer Office India

Mr. Sanmati Naik
Sr. Manager - Energy (RE), Fraunhofer Office India
405-406, 30 MG Road, Bengaluru – 1
e-Mail: sanmati.naik@fraunhofer.in
Tel: +91 80 40965008/09, Mob: +91 7996425980
www.fraunhofer.in www.fraunhofer.de